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ABSTRACT

Performance on The Scholastic Aptitude Test-Verbal (SAT-V) and Mathematical (SAT-M), the applicant's rank in class or Converted Secondary School Rank (Rank), and the applicant's general level of measured secondary school achievement as indicated by the Average of CEEB Achievement Tests (ACH AV) has been used by Vassar College as admissions measures and as predictors of freshman-year performance. Six validity studies involving data for classes entering Vassar during the period 1963 through 1971 reveal a relatively consistent pattern of relationships between Freshman Average Grade and the admissions tests scores. In each study, the best single indicator of probable performance during the freshman year has been either the CEEB Achievement average of the Converted School Rank. The SAT-V was the third best single indicator, and the SAT-M provided information of least value. However, the combination of scores provides a better indication of probable performance than any single score. The most recent validity study of the scores of Vassar's Class of 1975 (324 women and 170 men) confirm the findings of the previous six studies. The findings of this study also showed that the combination of all four academic predictors is slightly higher for women than for men, and the aptitude measures tend to be more closely associated with freshman grades among the women than among the men. Eight tables provide the data for the various studies. (DB)

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NOTES ON THE PREDICTION OF FRESHMAN GRADES AT VASSAR COLLEGE

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For Interinstitutional Cooperation
in Institutional Research

In affiliation with
EDUCATIONAL TESTING SERVICE, PRINCETON, N. J.

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Relevant Reports

- Prediction of Freshman Average Grade at Five CRC Colleges: A, B, C, D, and E (CRC Memorandum, 22 November 1965)

- Some Differentiating Characteristics of High- and Low-Performing Seniors in the Class of 1968 at Vassar College (CRC Memorandum, July 1968)

- Some Correlates of Student Progress in the Class of 1968 at Vassar College (CRC Memorandum, 2 August 1968)

- Study of Over- and Under-Achievers, Class of 1970, Freshman Year: Progress Report No. 1 (CRC Memorandum, 19 June 1969)

- Study of Over- and Under-Achievers, Class of 1970, Freshman Year: Progress Report No. 2 (CRC Memorandum, 15 July 1969)

- Prediction of First-year Grades at Vassar College (CRC Memorandum, 27 October 1969)

- Study of the Validity of Entrance Measures, Class of 1970 (CRC Memorandum, 30 October 1967)

- Admissions, 1968-69, Vassar College (CRC Memorandum, 6 November 1969)

- Contribution of SAT's to Prediction of Freshman Grades at CRC-Member Colleges (CRC Memorandum, 8 May 1970)

- Students Entering CRC-Member Colleges: Changes in Academic Qualifications, Attitudes Toward Sexually Segregated Education, and Selected Factors in Choice of College (CRC Memorandum, 31 August 1970)

- The CEEB Achievement Average (CRC Memorandum, 15 October 1970)

- The High School Average (CRC Memorandum, 2 November 1970)

- Predicting Cognitive Performance in Different Colleges (CRC Memorandum, 28 December 1970)

- The Utility of a Standard Composite for Predicting Freshman Average Grade in Eight Liberal Arts Colleges (CRC Memorandum,25 June 1971)

- Center Notes on Institutional Research, Vol. 1, No. 1, February 1972

- Center Notes on Institutional Research, Vol. 1, No. 2, December 1972

There is evidence to support the thesis that Vassar (like many other colleges) values, among other things, the qualities reflected in the performance of applicants on several "academic-qualifications indicators" namely, (a) The Scholastic Aptitude Test-Verbal (SAT-V) and Mathematical (SAT-M), (b) the applicant's rank in class, or Converted Secondary School Rank, (Rank) and the applicant's general level of measured secondary school achievement, as indicated by the Average of CEEB Achievement Tests (ACH AV).

WITH SOME VARIATION IN DETAIL AS A FUNCTION OF ANNUAL VARIATIONS IN THE SUPPLY OF APPLICANTS, individuals with the highest scores on these indicators have been offered admission, almost without exception. The proportion offered admission has decreased with level of scores, approaching zero at the lower end of the applicant score-range.

REPEATED STUDIES HAVE SHOWN, WITH SOME VARIATION IN DEGREE FROM YEAR TO YEAR, THAT THERE IS A MODERATE DEGREE OF CORRESPONDENCE BETWEEN STUDENTS' SCORES ON THE INDICATORS AND THEIR GRADES DURING THE FRESHMAN YEAR--students with higher scores earn better grades on the average than students with lower scores. When the four academic qualifications indicators are combined statistically to form a "best-weighted composite" (with major weight on Rank and ACH AV) for the purpose of predicting freshman average grade, the correspondence between predicted and actual standing has been about as shown, illustratively, for the Class of 1965:

- Of students whose combined admissions qualifications placed them in the top fifth, over half (56%) earned top-fifth grades, and almost three-fourths were in the high 40%.
- Of students in the lowest fifth on the predictive composite, almost two-thirds were in the lowest 40% in terms of actual freshman grades.

Despite the many individual reversals of form, the actuarial table lends support to the practice of favoring applicants with higher admissions credentials over those with lower credentials when freshman-year performance is the immediate criterion of the relative "value" or "worth" of students' performance or accomplishment.

Academic Qualifications versus Academic Performance During the Freshman Year: Vassar College, Class of 1965

Standing based on composite of admissions scores	Standing based on Freshman Year Average In percent					
	Low fifth[a]	4th fifth[b]	3rd fifth[c]	2nd fifth[d]	Top fifth[e]	Total
Top fifth	2	2	22	18	56	(100)
2nd fifth	10	18	27	16	29	(100)
3rd fifth	23	17	30	12	18	(100)
4th fifth	31	21	25	16	7	(100)
Low fifth	33	30	19	12	6	(100)
Total class	20	20	20	20	20	(100)

Note: The correlation between the predictive composite, developed in a preceding class, and actual grades in the Class of 1965 is r = .47. This table reflects tabulations of actual freshman standing for students classified according to standing on the predictive composite, by fifths.

[a]Grade point average below 2.20; [b]2.20-2.39; [c]2.40-2.69; [d]2.70-2.89; [e]2.90+

THE MOST RECENT VALIDITY STUDY, CONDUCTED BY CRC FOR VASSAR'S CLASS OF 1975, WITH DATA FOR 324 WOMEN AND 170 MEN, yields results which, like those of earlier studies, (a) point up the moderate degree of relationship between a composite of the admissions measures and freshman grades, and (b) confirm the relative superiority of School Rank and the CEEB Achievement Average over the SAT's as predictors of freshman-year performance. ❖

Six validity studies, involving data for Classes entering Vassar during the period 1963 through 1971, inclusive, reveal a relatively consistent pattern of relationships between Freshman Average Grade and the several admissions scores.

IN EVERY STUDY, the best single indicator of probable performance during the freshman year has been either

- the CEEB Achievement average, or
- Converted School Rank.

The Scholastic Aptitude Test-Verbal section typically has been the third best single indicator. The SAT-Mathematical score has provided information of least value for forecasting freshman year performance.

Relationship of Freshman Grades to Several Measures of Ability and School Achievement in Six Recent Classes: Vassar College

Class	Public school graduates						Private School graduates					
	Single predictors						Single predictors					
	V	M	Rk	AA	(R)	PFG	V	M	Rk	AA	(R)	PFG
1967	32	15*	28	38	(47)	--	20	15*	31	44	(49)	--
1968	20	21*	43	42	(55)	--	19	13*	21	26	(34)	--
1969	29	11	39	37	(--)	49	26	-03	23	29	(--)	39
1970	27	05*	31	22	(42)	38	26	03*	27	10	(35)	24
1972	21	-06	20	24	(37)	34	07*	11	42	20	(49)	33
1975[a]	23	15*	30	33	(44)[b]	--	21*	17	26	32	(39)[b]	--

Note: The figures in the body of this table are correlation coefficients showing the relationship of individual admissions measures and weighted composites of these measures, respectively, to Freshman Average Grade. Leading decimals have been omitted. V corresponds to SAT-Verbal, M to SAT-Mathematical, Rk to Converted School Rank, AA to the Average of CEEB Achievement tests, R to the coefficient of multiple correlation between the set of predictors and grades in the designated class, and PFG to Predicted Freshman Grade, with the coefficient representing a relationship in the designated class of predicted and actual freshman grades.

*This variable is negatively weighted when considered in combination with the other predictors.

[a]Men and women freshmen

[b]This multiple correlation coefficient reflects the inclusion of sex as a predictor variable along with the four academic predictors

WHEN ALL FOUR ADMISSIONS VARIABLES ARE CONSIDERED JOINTLY, as a battery of predictors, the combination of scores provides a better indication of probable performance than any single score--on the average, the four predictors correlate about .12 points higher than the best single predictor for public school graduates and .07 points higher for private school graduates.

Weights Reflecting the Contribution of Basic Entrance Measures to Prediction of Freshman Grades When Measures are Considered Jointly, Classes of '67, '68, '70, '72, and '75, Respectively: Vassar College

Class	Standard score regression weights									
	Public school graduates					Private School graduates				
	Joint predictors					Joint predictors				
	V	M	Rk	AA	(R)	V	M	Rk	AA	(R)
1967	14	-05*	24	31	(47)	08	-03*	22	37	(49)
1968	07	-02*	36	33	(55)	09	-02*	18	24	(34)
1970	18	-06*	30	15	(42)	22	-05*	24	01	(35)
1972	12	-19**	22	22	(37)	-06*	01	45	27	(49)
1975[a]	01	-02*	23	30	(44)[b]	-01*	04	17	25	(39)[b]

Note: All numerical entries in the table should be preceded by a decimal point. The weights shown in the first four data columns under each school-group are those which are applicable to the respective component variables (designated at head of column) when all have been expressed in comparable, standard score, units. The parenthetical entry is the coefficient of multiple correlation between the four measures (weighted as indicated) and Freshman Average Grade in the respective samples.

*Suppression effect--simple correlation with FAG is positive.

**Reflects negative correlation with Freshman Average Grade.

[a]Men and women freshmen

[b]This multiple correlation coefficient reflects the inclusion of sex as a predictor variable along with the four academic predictors

●CONSIDERATION OF THE RELATIVE WEIGHTING THE SEVERAL SCORES when they are treated as a battery leads to the conclusion that the two indices of school performance, viz., School Rank and the Average of CEEB Achievements, provide most of the information of value for the prediction of freshman grades--the SAT's, per se, add little new information. Moreover, the contribution of these scores has tended to be indirect, in the form of suppression--i.e., they are positively

related to Freshman Average Grade when considered individually, but are negatively weighted when included in the full battery.

The relative weighting of the several predictors is about the same for the Class entering in 1971 as for the Class entering in 1963, in both public and private school groups. This means that student rankings based on the 1963 weighting of admissions scores would correspond extremely closely to student rankings based on the 1971 weighting of the admissions scores. ❖

The Class of 1975 included approximately 34 percent men.

Findings summarized in the table (at right) indicate that the correlation between Freshman Grades and the best combination of all four academic predictors is slightly higher for women than for men, and that the aptitude measures (SAT-V and SAT-M) tend to be more closely associated with Freshman Grades among the women freshmen than among the men.

The negative weighting for Sex (coded 2 = Male, 1 = Female) reflects the fact that men earned lower freshman averages than women.

Some increase in multiple correlation occurs when Sex is added to Rank and Achievement Average (Row 8 vs. Row 6 in table) indicating that information about the Sex of an applicant should be taken into account in estimating probable performance during the freshman year.

Correlation of Selected Admissions Variables with Freshman Average Grade: Vassar College, Class of 1975

Row	Admissions variable	Correlation with freshman average grade				
		men	women	pub	pvt.	total
(1)	Converted school rank	.22	.28	.30	.26	.28
(2)	SAT-Verbal	.19*	.26	.23	.21*	.23
(3)	SAT-Mathematical	.15*	.25	.15*	.17	.16
(4)	Achievement average	.35	.33	.33	.32	.33
(5)	Sex (M = 2, W = 1)	--	--	-.15	-.14	-.15
(6)	Rank + Achievement	.365	.409	.422	.367	.401
(7)	Rank + Ach + V + M	.374	.411			
(8)	Rank + Ach + Sex			.436	.385	.413
(9)	Rk + Ach + Sex + V + M			.436	.386	.413

*These variables are negatively weighted when combined with Rank and Achievement

- The best single predictor of freshman year performance at Vassar College for men and women, respectively, and for public and private school subgroups, respectively, is the Average of CEEB Achievements.

  Best predictor: CEEB ACHAV
  2nd best : Converted School Rank
  3rd best : SAT-V
  4th best : SAT-M

- The best combination of two predictors at Vassar for the same subgroups, is Achievement Average and Converted School Rank.
- When sex is treated as a coded variable and included as a predictor, the best combination of three predictors is Achievement Average, Converted School Rank, and Sex
- Scores on the Scholastic Aptitude Test do not contribute any new predictive information when SAT-V and SAT-M scores are added to the best combination of three. There is no increase in the multiple correlation when these two scores are added to the best three. Moreover, when they are included in the battery, both SAT scores are negatively weighted (i.e., act as suppressor variables) for men, SAT-M is negatively weighted for public school graduates, and SAT-V is negatively weighted for private school graduates.

●However, knowledge of the freshman's SAT scores does not shed a useful amount of additional light on performance potential, once the student's Converted School Rank and CEEB Achievement Average have been taken into account. (Compare coefficients in Rows 6 and 7, and Rows 8 and 9 respectively.) ❖

WHEN RELATIONSHIPS BETWEEN FAG AND THE SEVERAL ADMISSIONS SCORES ARE STUDIED BY SEX, we find that the SAT's are negatively weighted when included in the battery for men; the SAT's have small positive weights in the battery for women. In the analysis by school origin, SAT-M has a negative weight in the private school sample, although, as we have seen, these scores have a positive albeit low relationship to FAG when considered individually.

Taken in conjunction with evidence that Rank and Achievement Average provide essentially all the grade-related information contained in the entire battery of four academic indicators, the finding that SAT's make their limited contribution to prediction by functioning as suppressor variables (more often than not) suggests that SAT's, per se, have very limited utility for ranking applicants according to probable level of performance during the freshman year.

Weights Reflecting the Contribution of Basic Entrance Measures to Prediction of Freshman Grades When Measures are Considered Jointly: Vassar College, Class of 1975

Admissions variable	Standard score regression weights				
	Men	Women	Public	Private	Total
Converted School Rank	118	235	231	172	203
SAT-Verbal	-063*	034	008	-006*	002
SAT-Mathematical	-088*	051	-022	044	000
Achievement Average	405	271	304	251	295
Sex	--	--	-087**	-130**	-105**

Note: Leading decimals have been omitted. The weights shown are those which are applicable to the respective admissions variables when all are expressed in comparable, standard score, units and considered jointly as a battery of predictors.

*This variable is positively related to Freshman Average Grade in the sample, but is negatively weighted when included in the composite.

**In coding this variable, men were assigned a code of 2 and women a code of 1. The negative sign for this regression weight indicates that men earned lower average grades than women with comparable Rank, Verbal, Mathematical, and Achievement Average scores.

° School Rank and the average of CEEB Achievements, both of which are more "complex" measures than the SAT, appear to provide essentially all the freshman-grade related information contained in the admissions variables, although information regarding the sex of the student appears to be a useful addition to that provided by the academic measures.

° The functional contribution of the SAT, per se, to prediction of Freshman Average Grade is perhaps best reflected in the data for the total sample of freshmen--i.e., zero weighting for SAT's, given the student's Converted Rank and CEEB Achievement Average. The average of CEEB achievements is relatively heavily "saturated" with SAT-type "information". Evidently all the SAT-type information that can usefully be applied in the prediction of freshman grades in the Vassar setting is provided by the Achievement Average.

The combination of low predictive validity and suppressor variable functioning when the SAT is added to a battery which includes The CEEB Achievement Average has been found in similar studies at several liberal arts colleges. (see *The Contribution of SAT's to the Prediction of Freshman Grades at CRC-member Colleges*, CRC, 8 May 1970). Generally speaking, this does not mean that SAT-type abilities are unimportant. Rather, because of the overlap between the SAT's and the Achievement Average, and the closer relationship of the Achievement Average to grades, the information provided by the SAT's, per se, is redundant.

This phenomenon, which has been observed in other liberal arts settings, raises general questions regarding the most effective and efficient allocation of "admissions testing time" as between tests of "aptitude" and tests of "achievement." ❖

Apart from the fact that men make up some 34 percent of the Class of 1975, insofar as comparative admissions data and first-year performance data are concerned the major difference between the Classes of 1965 and 1975 is in the level of freshman-year grades--the more recent Class posted a considerably higher freshman year average (2.79) than the earlier Class (2.50) even though their admissions-test scores are about the same and their School Rank slightly lower. This suggests that grade average return per unit of academic qualifications was greater for the Class of '75 than for the Class of '65. The most efficient prediction formula for predicting Freshman Average Grade in the Class of 1965 was developed in a 2/3 sample of the Classes of 1962, 1963, and 1964, combined, and it yields a "best estimate" of Freshman Average Grade, circa 1965, for students with a given combination of School Rank and Achievement Average:

Predicted FAG (1965)
= .02316 (Rank)
+ .02621 (ACH)
- .60668

- Substituting the average scores of freshmen entering in 1961, shown in the table, we get a Predicted FAG of approximately 2.55 for the Class of 1965, as compared to actual of 2.50.
- Substituting the average scores of women freshmen in the Class of 1975, we get a Predicted FAG of 2.51 as compared to the actual average of 2.84.
- Thus, we find that the average of grades awarded to freshmen during 1971-72 was about one-third a grade point higher than that expected for freshmen with similar admissions qualifications during 1961-62.

Average Scores on the Admissions Variables and the Average of Freshman Grades for Vassar's Classes of 1975 and 1965

Variable	Average scores on the variables (mean)							
	Class of 1965			Class of 1975				
	Pub	Pvt	Total	Pub[a]	Pvt[a]	Men[b]	Women[b]	Total[a]
Freshman Average	2.54	2.45	2.50	2.82	2.75	2.69	2.84	2.79
School Rank	68.7	60.7	65.4	65.2	57.0	58.7	63.8	62.0
SAT-Verbal	63.9	63.0	63.5	63.4	63.1	63.5	63.1	63.3
SAT-Mathematical	59.8	57.7	58.9	62.8	62.0	65.6	60.9	62.5
Achievement Average	62.5	63.4	62.8	63.0	62.7	63.2	62.7	62.9

Note: The "Total" column for the Class of 1965 and the "Women" column for the Class of 1975 are directly comparable; both involve averages for women freshmen without regard to school background.

[a]Among students from public schools, 29 percent are men; 43 percent of the private school subgroup and 34 percent of the total were men.

[b]Among men, 52.4 percent were of public school origin; among women, 66.4 percent graduated from a public secondary school, up from about 50 percent in the Class of 1965.

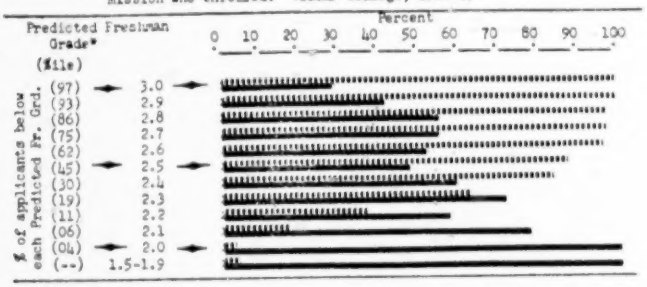
- Students from public schools and those from private schools tend to have comparable scores on the SAT's and CEEB Achievement Tests. However, students from private schools have lower School Rank, reflecting the higher academic "standards" characteristic of selective, primarily independent secondary schools as opposed to "open admission" public, high schools.
- Considering the admissions qualifications of women only, the Class of 1965 and the Class of 1975 were quite similar--women in the Class of 1975 were slightly lower in Class Rank, even though the proportion of public school graduates was greater than in the Class of 1965.
- The mean Freshman Average Grade for women in the Class of 1975 was higher by about one-third of a grade point than the mean Freshman Average Grade for women in the Class of 1965. And, the women in the Class of 1975 had a higher freshman average than the men.

Current grading standards would appear to be somewhat less stringent than those which obtained for the Class of 1965. ❖

AS NOTED AT THE OUTSET, VASSAR COLLEGE HAS PLACED CONSIDERABLE EMPHASIS ON THE SEVERAL ACADEMIC QUALIFICATIONS INDICATORS UNDER CONSIDERATION IN THIS STUDY IN ASSESSING THE ELIGIBILITY OF CANDIDATES FOR ADMISSION TO THE COLLEGE. The same can be said of other liberal arts colleges which have participated in CRC studies.

For a relatively recent Class, offers of admission and candidate acceptances were tabulated by level of Predicted Freshman Average Grade (a composite of the four admissions scores). The pattern of offers points up the extent to which judgments of eligibility for admission corresponded with the standing of candidates on the composite index. It does not follow, of course, that the Predicted Freshman Grade index, per se, was necessarily available to or considered by the College in each case. A similar degree of correspondence could result from reliance on the individual admissions scores involved when forming judgments regarding the eligibility of candidates for admission. ❖

Percentage of applicants offered admission, and percentage of those offered admission who enrolled: Vassar College, 1968-69



*A composite of SAT-V, SAT-M, Converted School Rank, and CEEB Achievement Average

●This study and others indicate that higher-scoring students earn higher grades on the average than their lower-scoring classmates. However all studies that have been made to date indicate that admissions scores are not predictive of continuance in the College.

Data on the average admissions scores and school background of members of the Class of 1968 at Vassar College, by level of junior-year grades, plans for postgraduate study, and record of survival (i.e., graduation versus nongraduation)

Group	% of Public School Origin	Averages on admissions variables SSR	SAT-V	SAT-M	AchAv
Graduating groups, post-graduate study plans	(81.0)				
a) High achievers, Arts and Sciences	(84.6)	72.2	67.1	64.2	66.4
b) High achievers, Professional	(89.5)	70.8	64.8	65.3	64.8
c) Medium and low achievers, Arts and Sciences	(87.5)	68.8	63.1	60.1	61.1
d) Medium and low achievers, Professional	(66.7)	69.1	63.7	60.7	61.6
Graduating groups, no post-graduate study plans	(64.6)				
e) High achievers	(70.1)	66.9	65.0	63.0	64.2
f) Medium achievers	(69.7)	64.8	64.4	60.6	63.3
g) Low achievers	(54.8)	63.7	63.7	61.6	62.4
Nongraduating groups	(61.4)				
h) Withdrew after more than one year	(56.0)	66.4	64.9	63.9	63.4
i) Withdrew after no more than one year	(70.0)	68.3	64.2	62.5	62.4
Total (N = 436)	(68.8)	66.8	64.5	62.1	63.3

In the Class of 1968, for example, dropouts had admissions credentials which, on the average, were equal or superior to those of graduating seniors with medium or low grade-point averages during their junior year.

●The current analysis indicates that in making judgments regarding the relative grade-earning potential of several candidates, the College should give more weight to the Average of CEEB Achievements, the Converted School Rank and Sex, than to Scholastic Aptitude Test scores.

●SAT-Verbal scores would appear to provide a useful basis for "in the ballpark" types of judgements regarding the fit between candidates and the normal or typical distribution of scores for Vassar students. ❖